What is claimed:

1.   A method of determining a position of a target region in a medical

procedure, comprising:

5   acquiring an input image of a target region;

enhancing a feature of the input image;

registering the input image with a template; and

determining a position of the target region in the input image based on the

registering.

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. 2.   The method of claim 1, wherein the enhancing comprises determining a

composite image of previously acquired input images.

3.   The method of claim 2, wherein the determining a composite image

15   comprises performing an image averaging on the previously acquired input

images.

4.   The method of claim 2, wherein the enhancing further comprises

subtracting the composite image from the input image.

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5.   The method of claim 3, wherein the image averaging is performed using a

boxcar averaging technique.

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6.   The method of claim 3, wherein the image averaging is performed based on a weighted average.

5   7.   The method of claim 1, further comprising selecting the template from a plurality of templates.

8.   The method of claim 7, wherein the selecting comprises choosing a template from the plurality of templates that best matches at least a portion of the

10   input image.

9.   The method of claim 7, wherein the selecting comprises:

comparing the input image with at least a subset of the templates; and

selecting the template that best matches at least a portion of the input

15   image.

10.   The method of claim 7, wherein the selecting comprises comparing the input image with the template that is generated at approximately a same time-point or a same phase of a physiological cycle as the input image.

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11.   The method of claim 7, wherein the selecting comprises:

determining a previously registered template; and

comparing the input image with the template next in line to the previously

registered template.

12.   The method of claim 1, wherein the determining a position of the target

5   region comprises determining a position of the image in the input image that best

matches the template.

13.   The method of claim 1, wherein the input image comprises a fluoroscopic

image.

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14.   The method of claim 1, further comprising performing a medical procedure

based on the determined position of the target region.

15.   The method of claim 14, wherein the medical procedure comprises

15   directing a radiation beam to an object.

16.   The method of claim 15, wherein the performing the medical procedure

comprises changing a direction of a radiation beam in response to the

determined position.

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17.	The method of claim 15, wherein the performing the medical procedure comprises gating a delivery of the radiation beam in response to the determined position.

5	18.	The method of claim 1, wherein the target region comprises at least a part of an animal body.

19.	The method of claim 18, wherein the at least a part of an animal body comprises a lung tissue or a heart tissue.

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20.	The method of claim 18, wherein the at least a part of an animal body comprises a bone.

21.	The method of claim 1, wherein the target region comprises at least a part

15	of a non-animal object.

22.	A system for determining a position of a target region in a medical procedure, comprising:

	means for acquiring an input image of a target region;

20	means for enhancing a moving object in the input image;

	means for registering the input image with a template; and

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means for determining a position of the target region in the input image based on the registering.

23.   The system of claim 22, wherein the means for enhancing comprises means for determining a composite image of previously acquired input images.

24.   The system of claim 22, further comprising means for selecting the template from a plurality of templates.

25.   The system of claim 24, wherein the means for selecting comprises means for choosing a template from the plurality of templates that best matches an image in the input image.

26.   The system of claim 22, wherein the means for acquiring an input image comprises means for generating a fluoroscopic image.

27.   The system of claim 22, further comprising means for performing a medical procedure based on the determined position of the target region.

28.   The system of claim 27, wherein the means for performing the medical procedure comprises means for directing a radiation beam to an object.

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29.   The system of claim 28, wherein the means for performing the medical procedure comprises means for changing a direction of a radiation beam in response to the determined position.

5   30.   The system of claim 28, wherein the means for performing the medical procedure comprises means for gating a delivery of the radiation beam in response to the determined position.

31.   A computer readable medium having a set of stored instructions, the

10   execution of which causes a process to be performed, the process comprising:

acquiring an input image of a target region;

enhancing a moving object in the input image;

registering the input image with a template; and

determining a position of the target region in the input image based on the

15   registering.

32.   The computer readable medium of claim 31, wherein the enhancing comprises determining a composite image of previously acquired input images.

20   33.   The computer readable medium of claim 31, wherein the process further comprising selecting the template from a plurality of templates.

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34. The computer readable medium of claim 33, wherein the selecting comprises choosing a template from the plurality of templates that best matches an image in the input image.

5   35. The computer readable medium of claim 30, wherein the input image comprises a fluoroscopic image.

36. The computer readable medium of claim 30, wherein the process further comprising performing a medical procedure based on the determined position of 10   the target region.

37. The computer readable medium of claim 36, wherein the medical procedure comprises directing a radiation beam to an object.

15   38. The computer readable medium of claim 37, wherein the performing the medical procedure comprises changing a direction of a radiation beam in response to the determined position.

39. The computer readable medium of claim 37, wherein the performing the 20   medical procedure comprises gating a delivery of the radiation beam in response to the determined position.

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40.   A method of monitoring a position of an object, comprising:

providing a reference image of the object;

acquiring a first image of the object;

determining a first composite image based on the reference image and the

5   first image; and

determining whether the object has moved based at least on the first

composite image.

41.   The method of claim 40, further comprising determining a first value

10   associated with a contrast of the first difference image.

42.   The method of claim 40, wherein the determining whether the object has

moved is performed based on the first value.

15   43.   The method of claim 40, further comprising:

acquiring a second image of the object;

determining a composite image based on the second image and the

reference image; and

determining whether the object has moved based at least on the second

20   composite image.

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44. The method of claim 43, further comprising determining a second value associated with a contrast of the second composite image.

45. The method of claim 44, wherein the determining whether the object has
5 moved is performed based on the second value.

46. The method of claim 40, wherein the object comprises at least a portion of an animal body.

10 47. The method of claim 46, wherein the at least a portion of an animal body comprises a bone.

48. The method of claim 40, wherein the first image comprises a fluoroscopic image.
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49. The method of claim 40, further comprising enhancing a moving object in the first image.

50. A system for monitoring a position of an object, comprising:
20   means for providing a reference image of the object;

    means for acquiring a first image of the object;

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means for determining a first composite image based on the reference image and the first image; and

means for determining whether the object has moved based at least on the first composite image.

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51.   The system of claim 50, further comprising means for determining a first value associated with a contrast of the first composite image.

52.   The system of claim 50, further comprising means for enhancing a moving

10   object in the first image.

53.   A computer readable medium having a set of stored instructions, the execution of which causes a process to be determined, the process comprising:

providing a reference image of the object;

15   acquiring a first image of the object;

determining a first composite image based on the reference image and the first image; and

determining whether the object has moved based at least on the first composite image.

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54.   The computer readable medium of claim 53, wherein the process further comprising determining a first value associated with a contrast of the first difference image.

5   55.   The computer readable medium of claim 53, wherein the determining whether the object has moved is performed based on the first value.

56.   The computer readable medium of claim 53, wherein the process further comprising enhancing a moving object in the first image.

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